

knowledge of how to apply them to his work spells its importance to him.

The young engineer must remember that engineering is not merely the getting and holding of jobs, or the handling of a big contract. There is the *science* as well as the *practice* of engineering, and experience shows that the men who have played a prominent part in the development of both have seldom been those who have had an aversion to mathematics.

While there is an excuse for the scarcity of purely mathematical treatises in an engineer's library, in that mathematics is a member of the family of "pure" sciences, it is not to be inferred by the young engineering student that the owner has not still a working acquaintance with the principles, at least, of the science.

CONCRETE CONSTRUCTION.

In every line of construction in which Portland cement has been used, the first objection raised by the layman has been that such skilled construction methods are necessary that frequent failures are likely. Because concrete looks so unstable when first poured, and takes years to reach its height of perfection, it is likely to be condemned even by city commissioners. So, it is not surprising to find many officials vigorously opposing concrete roads because "it requires such a lot of care and watching to get them laid right."

But are faulty construction methods or dishonest contracting any more fatal to concrete roads than to roads of any other type? We hold no brief for concrete roads. As a matter of fact, we believe they will have their limitations of usefulness, just as have macadam and brick. But some of the concrete roads that have been built are so excellent that concrete—properly constructed—must be given place as a paving material worthy of consideration along with other materials. It must not be tabooed merely on account of poor contracting being likely to ruin the road.

Dishonest, careless or incompetent construction can as readily spoil sheet asphalt, brick, bituminous macadam or other pavements, as it can concrete.

EDITORIAL COMMENT.

Dr. J. A. Amyot and Mr. F. A. Dallyn, C.E., water bacteriologist and chief engineer, respectively, of the Provincial Board of Health, have reported as follows concerning the Thirty-One Mile and Pemichangaw Lakes scheme of water supply for the city of Ottawa. (See *The Canadian Engineer*, Oct. 16th, p. 595):

"Investigation of the waters and catchment basin of the proposed water supply for Ottawa at Thirty-one Mile and Pemichangaw Lakes, together with the perusal of the report of Sir Alexander Binnie, convinces us of the feasibility and value of the scheme. We have no hesitation in recommending its approval by the provincial board in preference to any other source and supply heretofore proposed."

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A couple of weeks ago our esteemed contemporary, "Canadian Machinery," published a proposed design for a new Machinery Hall at the Canadian National Exhibition. The idea is excellent. There certainly should be a new machinery building. The reproduction of the suggested design in our columns is unnecessary, as it is en-

tirely unofficial, but we desire to support heartily the general scheme.

The plan offered by Mr. Hare in "Canadian Machinery" may possibly meet the needs of the machinery firms, but the Exhibition's architects will likely further improve upon it. We would suggest to the Exhibition Board that, when the design of the building is under contemplation, they consult a score or more of the leading machinery manufacturers and obtain their views of their own requirements.

LETTER TO THE EDITOR.

Electrification of the Canadian Northern Tunnel.

Sir,—In your issue of October 9th, you say, on page 571: "Of all the great railway systems of the world using electricity for the operation of their terminals, there is not one which has not adopted this system only after previously using steam. The Canadian Northern terminal in Montreal, therefore, will be the first to be operated entirely by electricity from the commencement. No steam locomotive-drawn trains will enter the tunnel. Specially constructed electric locomotives will be exchanged for the steam engines at the Back River yards."

A few days ago some local newspapers, commenting on the contract awarded to the Canadian General Electric Company for the electrification of the Canadian Northern terminal in Montreal, also stated that this would establish a record, being the first time any railway terminal would be operated by electricity from the beginning. This, of course, is quite wrong, as it is exactly what was done on the Pennsylvania Railroad when, in 1901, it decided to bring its trains to New York, exchanging steam engines for electric locomotives at Newark, some 12 miles away. Aside from the construction and electrification of a new line and of subaqueous and land tunnels it included the construction of a new terminal which, of course, was operated entirely by electricity, as it should be, from the commencement in January, 1910.

Long before this, however, the same had been done in Paris. The Orleans Railway Company decided in 1897 to extend its lines 2.5 miles from the Austerlitz station to a better and more central location in the city of Paris, to its present terminal called the Quai d'Orsay station. This involved the construction of 2.5 miles of tunnels and of a new terminal which were operated by electricity from the beginning of operations in 1899.

Far from changing from steam to electricity, these improvements were designed for electric operation and nothing else.

Mr. A. J. Cassatt, President of the Pennsylvania Railroad, when in Paris in 1900 was so well impressed with the electrical operation of the Quai d'Orsay station and of the practicability of exchanging locomotives on the outskirts of the city to bring the trains in a new terminal that he began at once to orient the policies of the Pennsylvania in that direction.

Many books and technical papers have described these undertakings which it is needless to enumerate in detail. I might, however, mention among them *Revue Générale des Chemins de fer et des Tramways*, Nos. of February and November, 1898, and of May and July, 1901; and *Transactions American Society of Civil Engineers*, Volume XLI., LXVIII. and LXIX.

Yours very truly,

Montreal, October 13th, 1913. PAUL SEUROT.